

**U.S. Environmental Protection Agency  
Science Advisory Board  
Ecological Processes and Effects Committee Augmented for Review of the  
Ecological Assessment Action Plan**

**Summary Minutes**

**Date and Time:** February 22, 2012, 12:00 – 4:00 p.m. (Eastern Time)

**Location:** By teleconference

**Purpose:** The purpose of the teleconference was to review and provide advice on the draft EPA document, *Integrating Ecological Assessment and Decision-Making at EPA: 2011 RAF Ecological Assessment Action Plan* (August 11, 2010)

**Attendance:**

*Members of the EPA Science Advisory Board (SAB) Ecological Processes and Effects Committee Augmented for Review of the Ecological Assessment Action Plan:*

Dr. Ingrid Burke  
Dr. Ernest F. Benfield  
Dr. Gregory Biddinger  
Dr. G. Allen Burton  
Dr. Peter Chapman  
Dr. Loveday Conquest  
Dr. Richard Di Giulio  
Dr. Robert Diaz  
Dr. Lucinda Johnson  
Dr. Thomas W. La Point  
Dr. Wayne Landis  
Dr. Judith L. Meyer  
Dr. Amanda Rodewald  
Dr. William Stubblefield

*SAB Staff:*

Thomas Armitage, Designated Federal Officer

*EPA Representatives (EPA speakers and other individuals who requested access to the teleconference):*

Mace Barron, Office of Research and Development  
Betsy Behl, Office of Water

Diane Henshel, Office of the Science Advisor  
Ronald Landy, Office of Research and Development  
Lawrence Martin, Office of the Science Advisor  
Michael McDonald, Office of Research and Development  
Chuck Noss, Office of Research and Development  
Edward Ohanian, Office of Water  
Mary Reiley, Office of Water  
Glenn Suter, Office of Research and Development

*Public (individuals who requested access to the teleconference):*

Anne Fairbrother, Exponent  
Maria Hegstad, Risk Policy Report  
Alexandra Reyes, CQ Transcriptions  
Randall Wentsel, Exponent  
Linda Wilson, New York State Office of the Attorney General

### **Teleconference Summary:**

#### **Convene the meeting**

Dr. Thomas Armitage, Designated Federal Officer (DFO) for the Ecological Processes and Effects Committee, convened the teleconference at 12:00 p.m. Eastern Time. He stated that the Committee was meeting by teleconference to review the Ecological Assessment Action Plan developed by EPA's Risk Assessment Forum (RAF) and he identified the Committee members who were on the call. He stated that the EPA Science Advisory Board (SAB) was a chartered federal advisory committee and he reviewed Federal advisory Committee Act (FACA) requirements. He stated that summary minutes of the teleconference would be prepared and certified by the Chair. He noted the Panel's compliance with ethics requirements. Dr. Armitage then indicated that all of the meeting materials were available on the SAB web site (these materials included: the Federal Register Notice announcing the teleconference<sup>1</sup>, teleconference agenda<sup>2</sup>, charge to the Committee<sup>3</sup>, EPA review documents<sup>4</sup>, EPA provided background material<sup>5</sup>, EPA briefing material<sup>6</sup>, preliminary comments from Committee members<sup>7</sup>, and written public comments received<sup>8</sup>). He also noted that no requests had been received from members of the public to provide oral comments.

#### **Review of Agenda and Purpose of the Meeting**

Dr. Ingrid Burke, Chair of the SAB Ecological Processes and Effects Committee, reviewed the teleconference objectives and agenda. She stated that the purpose of the teleconference was to provide advice on EPA's draft Ecological Assessment Action Plan, and that the Committee would continue to meet on a teleconference on following day. She noted that review documents provided by EPA (the draft Ecological Assessment Action Plan and project descriptions addressing communication and ecosystem services) had been developed in response to a 2007 SAB report on advancing the science and

application of ecological risk assessment. Dr. Burke noted that several background documents referenced in EPA's charge had been made available to members. These included: 1) The 2007 SAB report on ecological risk assessment, 2) the report of an EPA colloquium, *Integrating Ecological Assessment and Decision-making at EPA: A Path Forward*, 3) a published paper describing a framework for integrating environmental assessment, 4) EPA's guidance document on generic ecological assessment endpoints for ecological risk assessment (hyperlinks to the online versions of these documents were provided in the charge to the Committee). Dr. Burke then reviewed the seven questions in EPA's charge to the Committee. She stated that the Committee would address the charge questions but was free to provide comments and advice beyond the charge.

Dr. Burke indicated that the Committee would hear several presentations from EPA on the draft Ecological Assessment Action Plan and that members would have an opportunity to ask clarifying questions about the Plan and/or the charge questions. She stated that the Committee would then discuss responses to each of the charge questions. She indicated that various members had been assigned to lead the discussion of the charge questions (assignments were identified on the agenda). Dr. Burke also reminded members of their assignments to prepare synthesis responses to the charge questions. She noted that lead writers should send these responses to the DFO after the teleconference. She indicated that after the teleconference she would work with the DFO to prepare the Committee's draft report before it was sent to the members for review and discussion on another teleconference. Dr. Burke also noted that after that teleconference, the report would be revised as necessary and sent to the Chartered SAB for quality review and final approval.

### **EPA Presentations**

Several EPA speakers made presentations to the Committee. Their presentation slides are included in the meeting materials available on the SAB Web site (see materials cited).

#### *Review of the EPA Ecological Assessment Action Plan*

Dr. Edward Ohanian, Chair of EPA's Risk Assessment Forum, provided introductory remarks to the Committee. He reviewed the mission and membership of EPA's Risk Assessment Forum. He also discussed the kinds of products produced by the RAF and how they are developed. In addition, Dr. Ohanian discussed how the RAF Ecological Assessment Action plan had been developed. Committee members asked Dr. Ohanian questions about the nature of the Action Plan, how the policy recommendations in the Plan differed from guidelines, and how RAF guidance was implemented by EPA programs. Dr. Ohanian explained that RAF provided recommendations to EPA's Science and Technology Policy Council (STPC) which developed policies to advance the Administrator's environmental and public health priorities. He also indicated that the RAF provided guidance to assist EPA programs.

Mr. Lawrence Martin of EPA's Office of the Science Advisor then reviewed the Agency's charge to the Committee and responded to questions from members. A

Committee member asked how the recommendations in the Action Plan would be implemented. Mr. Martin responded that the science policy recommendations in the Action Plan would be considered by EPA's STPC, which would then develop policies. He indicated that the SAB was being asked to review the Plan before it was taken to the STPC.

#### *Science policy and technical practice initiatives*

Dr. Glenn Suter of EPA's Office of Research and Development provided an overview of the science policy and technical practice initiatives in the ecological assessment action plan. He asked Committee members to provide an indication of those initiatives that represented the most important set of activities to be undertaken by EPA. He noted that the Agency had limited resources to pursue the initiatives and asked the Committee to think about how initiatives might be prioritized. Several members remarked that it would be useful for EPA to develop case studies to illustrate how ecosystem services could be incorporated into ecological risk assessment.

A member questioned why EPA's Action Plan did not call for further advances in assessing cumulative risk. EPA staff responded that the RAF Ecological Oversight Committee had not focused on this issue, but it was being addressed by the RAF Cumulative Risk Technical Panel. Members also discussed the importance of integrating stressors to develop cumulative risk assessments.

#### *Integrated approach to ecological assessment*

Dr. Suter presented an overview of the proposed integrated approach to ecological risk assessment. He discussed the need to integrate human health and ecological risk assessments, promote cross media risk assessment approaches, and integrate different types of assessments. In his presentation he provided figures illustrating an approach to the integration of different kinds of assessments.

Committee members questioned how ecosystem services could be considered in the proposed integrated approach. Dr. Suter indicated that evaluation of ecosystem services would require the use of different kinds of endpoints, and that these endpoints could be included at any step in the process. Members discussed the kinds of endpoints that should be used to represent ecosystem services. Dr. Suter indicated that production functions were used to relate ecosystem services measurement and assessment endpoints. A member noted that use of production functions would change the assessment framework. A member asked whether there was ongoing EPA work to derive endpoints for sustainability. EPA staff responded that work had been planned to address sustainability. A member suggested that adaptive management be considered as part of the integrated ecological risk assessment framework.

### *Use of a weight-of-evidence approach to ecological assessments*

Dr. Suter next discussed the use of a weight-of-evidence approach in ecological risk assessment. He noted that weighing evidence was common practice in the scientific community but it had also been criticized as being subjective and non-quantitative. Dr. Suter discussed how evidence could be weighed in risk assessments conducted by EPA programs.

A member asked whether risk assessors at the Colloquium had considered the use of Bayesian approaches. Dr. Suter indicated that the Colloquium was more focused on identifying needs and gaps than developing a particular approach.

The Committee discussed how to respond to EPA's request to prioritize the initiatives proposed in the Ecological Assessment Action Plan. A member indicated that it was not clear how to address this question because different drivers needed to be considered in determining priorities. Another member questioned how important weight-of-evidence was relative to other activities that could be undertaken to address uncertainty. Dr. Suter indicated that, although prioritization was not part of the charge to the Committee it would be helpful to receive recommendations to help focus limited resources on the most important initiatives.

During the discussion of the weight-of evidence approach Dr. Burke indicated that she would have to leave the teleconference and asked Dr. Judy Meyer to continue to chair the meeting. Dr. Meyer served as acting Committee Chair in Dr. Burke's absence.

### *Communicating ecological risk assessment results to decision makers*

Ms. Mary Reiley of EPA's office of Water discussed the activities of a RAF technical panel formed to enhance the use of ecological risk assessment in EPA decision making. She noted that ecological risk assessment results were not used consistently across EPA programs in decision making. She noted that the RAF panel would use questionnaires, interviews, and small group discussion to explore ecological risk assessment communication experiences between risk assessors and decision makers. The results of this work would be used to develop guidance to help risk assessors engage decision makers in ecological risk assessment design, and to more effectively present important risk assessment information to decision makers. In addition, the RAF panel intended to develop materials for managers on the nature of ecological risks. Ms. Reiley noted that these materials could include webinars, seminars and other tools and products.

A member asked EPA staff to describe the disciplinary expertise represented by members of the RAF technical panel. Ms. Reiley indicated that the panel members were ecological and human health risk assessors. She noted that the RAF panel members had experience in field and laboratory research and program policy.

A member asked whether there were any social scientists on the RAF panel. Ms. Reiley indicated that there were no social scientists on the RAF panel, but she noted that contractor support was available to provide additional support to the panel.

A member commented that it was important to consider the level of science training possessed by decision makers. Ms. Reiley acknowledged that some decision makers might not be trained in science disciplines but she noted that, in her experience, they had often been able to quickly understand the science issues.

Members commented on the importance of recognizing that traditional ecological knowledge was used in decision making. They indicated that this kind of information was particularly important in decisions involving the Tribes and First Nations. A member noted that it was important to more effectively engage stakeholders in designing and communicating ecological risk assessments.

A member asked EPA whether the RAF panel was talking to the risk assessors and managers separately. Ms. Reiley responded that EPA was talking to the risk assessors and managers separately but planned to bring the group together for a case study. A member commented that the decisions facing EPA were highly variable. He noted that the same communication approaches might not be equally effective in all cases. Ms. Reiley agreed, acknowledging that different types of decisions were associated with different kinds of outside pressures that impacted decisions. A member commented that different decision processes and expectations about how data come forward constrain the ability of risk assessors to communicate the information.

A member commented that the SAB was developing a report on integrating science and decision making. He commented that in developing that report, SAB members had interviewed EPA managers. He noted that it might be useful for the RAF panel to review the report.

#### *Ecosystem services as assessment endpoints in ecological risk assessment*

Dr. Mace Barron of EPA's Office of Research and Development described the activities of the RAF Ecosystem Services Endpoint Technical Panel. He indicated that the panel was developing general principles for incorporating ecosystem services into ecological risk assessment. He noted that this work was important to EPA because the use of ecosystem services in ecological risk assessment provided an improved means of communicating risk and informing risk management decisions. He noted that an additional benefit of this work was that the costs and benefits of protection and remediation could be cast in terms of contributions to human well being through identification and quantification of service losses and gains. Dr. Barron described the products being developed by the RAF panel. These products included a white paper establishing the technical basis for complementing traditional assessment endpoints with ecosystem services assessment endpoints, case studies applying the ecosystem services concept in ecological risk assessment, and an addendum to the RAF generic ecological assessment endpoints document.

A Committee member noted that the RAF was already working to develop the ecosystem services white paper and asked whether it had been necessary to get approval of the EPA Science and Technology Policy Council to do this work. EPA staff indicated that development of the white paper could proceed without further policy review because the ecosystem services research program had already been established.

A member asked why the RAF was developing its own terminology for ecosystem services when this had already been done as part in the Millennium Ecosystem Assessment. Dr. Barron responded that the ecosystem services research program had gone beyond upon the work of the Millennium Ecosystem Assessment. He briefly described some of the research undertaken in the program and indicated that additional input from the Committee would be very helpful.

Another member commented that the U.S. Forest Service had been considering ecosystem service endpoints in its assessments for some time, particularly in assessments concerning management of water supply and salmonids. He suggested that EPA consider work that had been done by the Forest Service.

A member asked EPA to describe the point where ecosystem services endpoints would be considered in the risk assessment process and whether EPA planned to complete both the white paper and addendum to the generic ecological assessment endpoints document by the 2012 target identified in the Agency's briefing. EPA staff responded that ecosystem services endpoints would be considered in problem formulation and risk characterization and that the Agency planned to complete both the white paper and the addendum by the 2012 target.

#### *Use of adaptive management to test and revise management actions*

Dr. Glenn Suter described the proposed use of adaptive management to test and revise EPA management actions. He defined adaptive management and discussed opportunities to use adaptive management in EPA programs. Members asked clarifying questions about EPA's definition of adaptive management. A member asked why adaptive management had not been more widely used by EPA for contaminated site cleanup. EPA staff responded that the Agency would require a more resources and time to implement adaptive management for contaminated sites. A member commented that the use of adaptive management could validate the methodologies that had been used and that in the long run this might justify the use of additional resources.

A member commented that there seemed to be a natural opportunity to merge adaptive management with the integrated approach to ecological assessment. He questioned why EPA was proposing separate science policy initiatives in these two areas. EPA staff responded that these two areas were distinct. Staff indicated that it would be possible for EPA to move forward with an integrated framework that would not depend upon a policy to apply adaptive management. Another member commented that integrating cause and effect assessments was part of the framework and that this supported the idea that adaptive management should be included in the framework. EPA staff responded that

adaptive management did fit into the framework, but framework encompassed other issues as well.

### *Strengthening science policies that promote Agency-wide ecological protection goals*

Dr. Anthony Maciorowski, a former EPA scientist who served on the Risk Assessment Forum, discussed strengthening science policies that promote Agency-wide ecological protection goals. He discussed the need for building consensus within EPA on the Agency's ecological protection goals. He noted that EPA programs addressed specific human health protection goals (for example, cancer and noncancer risks) but less often focused on specific ecological protection goals. He talked about the need for broader science policies to categorize and contextualize existing ecological assessments.

A member commented that the SAB was charged with advising EPA on science issues and was often reluctant to provide advice in policy areas. Dr. Maciorowski acknowledged this, but indicated that in this case the policy issues really focused on the science that EPA should adopt. Another member commented that global climate change was a key issue that should be addressed by EPA. He asked how EPA was handling the issue of global climate change. Dr. Maciorowski responded that the National Oceanic and Atmospheric Administration had the lead for this issue and that EPA's budget to address climate change was relatively small. The member commented that global climate change would affect almost everything EPA was doing and it was very important to consider it in developing ecological protection goals.

## **Panel Discussion**

Following Dr. Maciorowski's presentation, the Chair thanked EPA staff for their presentations and indicated that the Committee would next discuss the responses to EPA's charge questions. Panel members had submitted initial written comments in response to the charge questions. These written comments formed the basis for the initial discussion of the responses.

### *Discussion of the responses to charge question #1*

The Committee discussed the response to charge question 1. Members noted that development of the Ecological Assessment Action Plan and supporting documents had involved a large amount of effort by EPA. Members commented that the policy and technical practice initiatives outlined in the Ecological Assessment Action Plan seemed to be appropriate. A number of recommendations to improve the document were discussed. A member commented that the plan should address international efforts in ecological risk assessment. It was noted that the U.S. had appeared to have lost some of its leadership role in this area and that EPA appeared to be isolated from other federal agencies like the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration. In addition, it was noted that, although EPA had clarified the role of the



draft Plan and indicated that it would be further developed, the Plan was not very specific.

A member commented that incorporation of ecosystem services into ecological risk assessment would require involvement of social scientists, particularly economists. Members also commented that temporal and spatial scales needed clearer definition in ecological risk assessments.

Members noted that the Ecological Assessment Action Plan lacked citations. It was suggested that references to international literature be included in the Plan. It was also noted that a number of very relevant adaptive management and risk assessment approaches had been used by the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration and that these should be considered by EPA. A member commented that probabilistic tools could be applied to improve ecological risk assessments. A member commented that the previous SAB report on ecological risk assessment had discussed the importance of ongoing international work. Committee members commented that there was much literature available that could save EPA time and effort.

Another member commented that the EPA Colloquium responses to the previous SAB National Research Council reports on advancing risk assessment were good. However, several members commented on the vagueness of the Ecological Assessment Action Plan and indicated that it made the task of reviewing it somewhat difficult. There was concern expressed about the emphasis in the Plan on developing new guidance documents. A member suggested that it might be more useful to consider approaches other than developing new guidance documents.

A member reiterated the comment that it was important to keep up with new techniques and methodologies that were being developed in other nations. He also suggested that a technical practice initiative be associated with each of the science policy initiatives in the Plan. Members commented that if new guidance were developed it would be necessary to find ways to make sure that it was followed. A member commented that there were fundamental philosophical differences between the risk assessment approaches used in the U.S. and Europe (for example between the Toxic Substance Control Act the European REACH program). The member noted that more new information had been generated in Europe.

Another member commented that the issue of environmental justice had not been raised in EPA's action plan. She commented that the Plan should address the issue of protecting vulnerable populations and communities as well as the need to collaborate with social scientists.

The Chair asked members to comment on alternatives to developing more guidance. A member responded that guidance documents were important but could be difficult to interpret. He recommended that EPA develop case studies to support the guidance. Another member commented that EPA should develop case studies addressing big

picture issues such as climate change. He recommended that EPA develop two or three such case studies. A member noted that the 1992 ecological risk assessment conducted for the Kesterson Reservoir was a useful case study example.

A member commented that it was also important to explain case studies to the target audiences. He suggested EPA conduct outreach with the help of social scientists who were adept marketing this kind of information. Another member suggested that EPA carefully structure new guidance with a broad suite of supporting technology. He noted that the guidance was not developed solely for EPA. Other agencies also used it. He commented that guidance had value but it was important to develop it with the appropriate level of specificity. Another member agreed and noted that it was important to develop tools to help risk assessors move through the process.

The Chair commented that EPA's ecosystem services research program had emphasized the development of decision support tools. She asked members whether these kinds of tools were needed. A member responded that tools for uncertainty and sensitivity analysis would inform risk assessments. He indicated that it was important to move beyond the use of no observed effects concentrations and lowest observed effects concentrations. In this regard, he noted that it was important to educate policy makers and decision makers.

Another member commented that simple and effective tools could be developed to improve risk assessments. He suggested that the risk assessment process be structured with a checklist to promote consistency across the EPA. He indicated that it was important to tell risk assessors what to think about, and this kind of simple tool would be of use. A member indicated that EPA ORD had been doing important work on the use of influence diagrams as decision making tools.

The Chair thanked the members for their comments in response to charge question 1 and asked members to discuss prioritization of the proposed initiatives in EPA's Ecological Assessment Action Plan.

A member commented that he thought incorporation of ecosystem services and communicating ecological risk assessment results to decision makers might be two of the highest priority initiatives. Another member noted that strengthening EPA's ecological protection goals was somewhat disconnected from the other science policy initiatives. She noted that the others were more operational. The Chair agreed.

EPA staff noted that it would be useful to receive comments from the Committee on areas where EPA should focus its effort. The Chair indicated that time would be reserved on the Committee teleconference the following day to discuss prioritization. The Chair

then noted that the Committee would reconvene at 12:00 noon (eastern time) the following day to discuss the responses to charge questions two through seven. The DFO then recessed the teleconference.

Respectfully Submitted:

Certified as Accurate:

*/Signed/*

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Dr. Thomas Armitage  
Designated Federal Officer

*/Signed/*

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Dr. Ingrid Burke, Chair  
SAB Ecological Processes and  
Effects Committee

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Dr. Judith L Meyer, Acting Chair  
SAB Ecological Processes and  
Effects Committee

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by Panel members during the course of deliberations within the meeting. Such ideas, suggestions and deliberations do not necessarily reflect consensus advice from Panel members. The reader is cautioned to not rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters or reports prepared and transmitted to the EPA Administrator following the public meetings.

## ATTACHMENT A: COMMITTEE ROSTER

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### **U.S. Environmental Protection Agency Science Advisory Board (SAB) Ecological Processes and Effects Committee (EPEC) Augmented for Review of the Ecological Assessment Action Plan**

#### **CHAIR**

**Dr. Ingrid Burke**, Director, Haub School and Ruckelshaus Institute of Environment and Natural Resources, University of Wyoming, Laramie, WY

#### **EPEC MEMBERS**

**Dr. Ernest F Benfield**, Professor of Ecology, Department of Biological Sciences, Virginia Tech, Blacksburg, VA

**Dr. Peter Chapman**, Principal and Senior Environmental Scientist, Environmental Sciences Group, Golder Associates Ltd, Burnaby, BC, Canada

**Dr. Loveday Conquest**, Professor, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA

**Dr. Richard Di Giulio**, Professor, Nicholas School of the Environment, Duke University, Durham, NC

**Dr. Robert Diaz**, Professor, Department of Biological Sciences, Virginia Institute of Marine Science, College of William and Mary, Gloucester Pt., VA

**Dr. Lucinda Johnson**, Center Director, Center for Water and the Environment, Natural Resources Research Institute, University of Minnesota Duluth, Duluth, MN

**Dr. Thomas W. La Point**, Professor, Department of Biological Sciences, University of North Texas, Denton, TX

**Dr. William Stubblefield**, Senior Research Professor, Department of Molecular and Environmental Toxicology, Oregon State University, Corvallis, OR

#### **SAB MEMBERS**

**Dr. Judith L. Meyer**, Professor Emeritus, Odum School of Ecology, University of Georgia, Lopez Island, WA

**Dr. Amanda Rodewald**, Professor of Wildlife Ecology, School of Environment and Natural Resources, The Ohio State University, Columbus, OH

**CONSULTANTS**

**Dr. Gregory Biddinger**, Managing Director, Natural Land Management, Houston, TX

**Dr. G. Allen Burton**, Professor and Director, Cooperative Institute for Limnology and Ecosystems Research, School of Natural Resources and Environment, University of Michigan, Ann Arbor, MI

**Dr. Wayne Landis**, Professor and Director, Department of Environmental Toxicology, Institute of Environmental Toxicology, Huxley College of the Environment, Western Washington University, Bellingham, WA

**SCIENCE ADVISORY BOARD STAFF**

**Dr. Thomas Armitage**, Designated Federal Officer, U.S. Environmental Protection Agency, Washington, DC

## Materials Cited

The following meeting materials are available on the SAB website, <http://www.epa.gov/sab>, at the February 22, 2012 Ecological Processes and Effects Committee meeting page:

<http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/7E97A287A1F3BCE38525795600613A17?OpenDocument>

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<sup>1</sup> Federal Register Notice

<sup>2</sup> Agenda

<sup>3</sup> Charge to the Committee

<sup>4</sup> EPA Review Documents

- Integrating Ecological Assessment and Decision-making at EPA, RAF Ecological Assessment Action Plan (August 11, 2011)
- RAF Ecological Risk Assessment Communication Technical Panel Workplan (May 2011)
- RAF Incorporating Ecosystem Services as Endpoints for Ecological Risk Assessments Technical Panel (August 2010)

<sup>5</sup> EPA Provided Background Material

- Integrating Ecological Assessment and Decision-making at EPA: A Path Forward – Results of a Colloquium in Response to Science Advisory Board and National Research Council Recommendations

<sup>6</sup> EPA Briefing Material

- Presentation by Anthony Maciorowski – “Strengthen Science Policies that Promote Agency-Wide Ecological Protection Goals”
- Presentation by Edward Ohanian and Lawrence Martin – “SAB/EPEC Review of EPA Ecological Assessment Action Plan”
- Presentation by Glenn Suter – “Integrated Risk Assessment Approach to Ecological Assessments”
- Presentation by Glenn Suter – “Science Policy and Technical Practice Initiatives in the Ecological Assessment Action Plan”
- Presentation by Glenn Suter – “Use of Adaptive Management to Test and Revise Management Actions”
- Presentation by Glenn Suter – “Use of the Weight of Evidence Approach in Ecological Risk Assessment”
- Presentation by Mace Barron – “Ecosystem Services as Assessment Endpoints in ERA: RAF Technical Panel”
- Presentation by Mary Reiley – “Enhancing the Use of Ecological Risk Assessment in Agency Decision making: RAF Technical Panel”

<sup>7</sup> Preliminary Comments from Committee Members

- Preliminary comments from Committee members as of February 21, 2012
- Preliminary comments from Dr. Greg Biddinger
- Summary of the preliminary comments from Committee members in response to charge question 3 (prepared by Dr. Peter Chapman)

<sup>8</sup> Public Comments Received

- Jean Public